1.

The unit of pole strength is:

1. Am^2

2. Am

3. $\frac{A^2}{m}$

4. $\frac{A^2}{m^2}$

2.

The magnetic field due to a short magnet at a point on its axis at a distance X cm from the middle point of the magnet is 200 Gauss. The magnetic field at a point on the neutral axis at a distance of X cm from the middle of the magnet is:

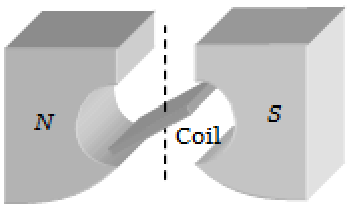
1. 100 Gauss

2. 400 Gauss

3. 50 Gauss

4. 200 Gauss

3.
The figure below shows the north and south poles of a permanent magnet in which *n* turn coil of the area of cross-section *A* is resting, such that for a current *i* passed through the coil, the plane of the coil makes an angle θ with respect to the direction of magnetic field B. If the plane of the magnetic field and the coil are horizontal and vertical respectively, the torque on the coil will be:



1. $\tau = niAB\cos\theta$
2. $\tau = niAB\sin\theta$
3. $\tau = niAB$
4. $None\ of\ the\ above$

4.

A cylindrical rod magnet has a length of 5 cm and a diameter of 1 cm. It has a uniform magnetization of 5.30 × $10^3 Amp/m^3$. What is its magnetic dipole moment?

1. $1 \times 10^{-2}\ J/T$

2. $2.08 \times 10^{-2}\ J/T$

3. $3.08 \times 10^{-2}\ J/T$

4. $1.52 \times 10^{-2}\ J/T$

5.

A magnet oscillates in the earth's magnetic field with time period T. If the mass is quadrupled, then a new time period will be:

1. 2T, motion remaining SHM

2. 4T, motion remaining SHM

3. T/2, motion remaining SHM

4. Unaffected but motion is not SHM

6.

A closely wound solenoid of 2000 turns and area of cross-section 1.5 × 10^{-4} m^2 carries a current of 2.0 A. It is suspended through its centre and perpendicular to its length, allowing it to turn in a horizontal plane in a uniform magnetic field 5 × 10^{-2} tesla making an angle of 30° with the axis of the solenoid. The torque on the the solenoid will be:

1. 3 × 10^{-3} Nm

2. 1.5 × 10^{-3} Nm

3. 1.5 × 10^{-2} Nm

4. 3 × 10^{-2} Nm

7.

Which one of the following is used to express the intensity of the magnetic field in a vacuum?

1. oersted
2. tesla
3. gauss
4. None of these

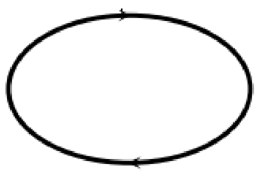
8.

A current wire is hidden in a wall. Its position can be located with the help of a:

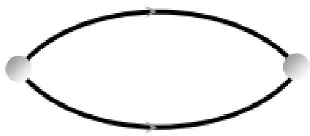
1. Moving coil galvanometer
2. Voltmeter
3. hot wire ammeter
4. Magnetic needle

9.

Below figures (1) and (2) represent lines of force. Which is the correct statement?



(1)



(2)

1. Figure (1) represents magnetic lines of force
2. Figure (2) represents magnetic lines of force
3. Figure (1) represents electric lines of force
4. Both figure (1) and figure (2) represent magnetic lines of force

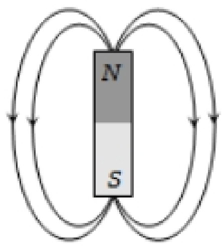
10.

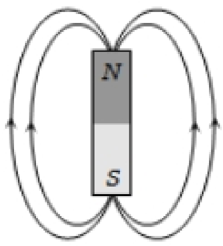
A magnet of magnetic moment $50\hat{i}\ A-m^2$ is placed along the x-axis in a magnetic field $\vec{B}=\left(0.5\hat{i}+3.0\hat{j}\right)T$. The torque acting on the magnet is:

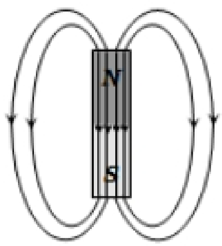
1. 175 $\hat{k}$ N-m
2. 150 $\hat{k}$ N-m
3. 75 $\hat{k}$ N-m
4. 25$\sqrt{37}$ $\hat{k}$ N-m

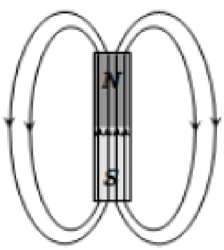
11.

The magnetic field lines due to a bar magnet are correctly shown in:

1. 

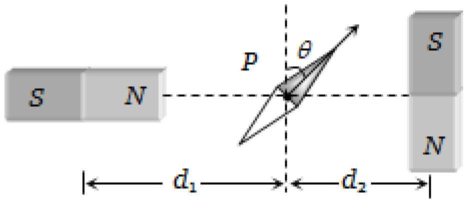
2. 

3. 

4. 

12.

Two magnets A and B are identical and these are arranged as shown in the figure. Their length is negligible in comparison to the separation between them. A magnetic needle is placed between the magnets at point P which gets deflected through an angle θ under the influence of magnets. The ratio of distance d_1 and d_2 will be:



1. $(2\ \tan\ \theta)^{1/3}$

2. $(2\ \tan\ \theta)^{-1/3}$

3. $(2\ cot\ \theta)^{1/3}$

4. $(2\ cot\ \theta)^{-1/3}$

13.

The magnetic lines of force inside a bar magnet are:

1. From south to the north pole

2. From north to the south pole

3. Not present

4. Intersecting each other

14.

The magnetic moment of a short dipole is 100 A-m^2. The magnetic induction in vacuum at 1 m from the dipole on the axis of the dipole is:

1. 2×10^{-5} T

2. 10^{-5} T

3. 2 μT

4. 1 μT

15.

Each of the two identical magnets, when suspended alone, makes 30 oscillations per minute at a place. The number of oscillations per minute, if they are fixed at right angles (to form a cross) and allowed to oscillate in the same field will be approximate:

1. 25 oscillation/minute

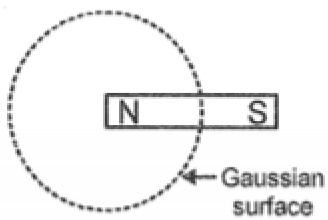
2. 30 oscillation/minute

3. 60 oscillation/minute

4. 15 oscillation/minute

16.

A Gaussian surface is drawn enclosing the N-pole of a bar magnet. The net magnetic flux through the Gaussian surface will be: (pole strength of N-pole is treated as positive and S-pole as negative)



1. Positive

2. Negative

3. Positive or negative

4. Zero

17.

The work done in rotating a magnet of the magnetic moment 100 A-m^2 through 90° from a direction parallel to the uniform magnetic field of strength 0.4×10^{-4} Tesla is:

1. 4 mJ

2. Zero

3. 6 mJ

4. 8 mJ

18.

When a big hole is made in a magnet, then its magnetic moment becomes:

1. More
2. Less
3. Same
4. Zero

19.

A magnetic dipole is placed at right angles to the direction of lines of force of magnetic field B. If it is rotated through an angle of 180°, then the work done is:

1. 2MB
2. MB
3. -2MB
4. Zero

20.

A magnetic needle suspended parallel to a magnetic field requires $\sqrt{3}$ J of work to turn it through 60°. The torque needed to maintain the needle in this position will be:

1. 3 J
2. $\sqrt{3}\ J$
3. $\frac{3}{2} J$
4. $2\sqrt{3}\ J$